Pollution Prevention Case Study	**Frigo Cheese Corporation** **Salt Whey Recovery/Reuse by Evaporation**
Standard Industrial Classification (SIC)	Cheese Manufacturer/2022
Process	Drawing off salted whey during cheesemaking
Type of Waste	Liquid salty whey waste
Strategies	Process Modification
Background	Frigo Cheese Corporation manufactures a wide variety of cheese at its Morgan, Wisconsin plant. Cheese manufacturing is a biochemical process in which milk is converted to a solid intermediate product known as curd. The curd is processed further to form the final cheese. A liquid by-product of this process, known as whey, must be drained from the curd. The whey is often recovered and sold as a food grade additive in the form of edible whey or Whey Protein Concentrate (WPC). After the initial whey is drained form the curd, salt is added to curd in order to remove additional whey. After the salting is completed, the salt whey is drawn off. Because this particular whey waste is salty, it can not be used as a food grade additive. Frigo Cheese landspread the salt whey on nearby agricultural land. This is a common practice for cheese facilities that are unable to discharge their high strength wastewater to a Publicly-Owned Treatment Facility (POTW). Approximately 2000 gal/day of salt whey was disposed by this method.
Motivation	Frigo Cheese wanted a better method of disposal for the salt whey. The landspreading of salt whey was unattractive to them because it increased the level of chlorides in the soil and posed a slight risk of crop damage if applied incorrectly. Landspreading was also a logistical burden.
Changes Implemented	Frigo Cheese began recovering salt from the salt whey and reusing it in the production process. The recovery process was developed by modifying an evaporator that was previously used for recovering edible whey. Frigo Cheese installed a stainless steel process pipeline from the salting tanks to the evaporator. The evaporation recovery process significantly reduced the salt whey

	wasted by separating pumpable salt whey from water. The salt whey is reused in the cheese production process, while the recovered water is used for cleaning and other purposes that don't require potable water.
Problems Encountered	Not all the salt whey can be recovered at this time. The USDA will not allow Frigo Cheese to reuse salt whey that has contacted wooden containers due to sanitation concerns. Frigo Cheese hopes to eventually recover all the salt whey by replacing the wooden containers with plastic containers. There was concern that the use of the recovered salt would have an adverse effect on the flavor and shelf life of the cheese. After implementing the recovery process, Frigo Cheese found that the recovered salt whey actually enhanced flavor, and had no effect on the cheese chemical composition or shelf life.
Material/Energy Balance	***Original Process*** **Feedstock** Salt 1000 lbs./day at $0.048/lb. **Waste** 2000 gallons per day of salt whey waste **Disposal** Landspreading ***Pollution Prevention Approach*** **Feedstock** Recovered salt whey (400 to 500 lbs/day) Fresh salt (500 to 600 lbs./day) **Waste** Approximately 500 gallons per day of salt whey containing up to 100 lbs of salt **Disposal** Landspreading
Economics	**Capital Cost** $2000 for the purchase and installation of the additional stainless steel pipeline **Operating/Maintenance Cost** The O/M cost is approximately $0.03 per lb. salt recovered.

	Payback Period A payback period of two months is calculated based on capital costs of $2000 and salt purchasing savings of $12,500 annually.
Company Address	Frigo Cheese Corporation Morgan Plant 3343 County Hwy. C Oconto Falls, WI 54154
Contact Person	While this facility has a good case study, it has since gone out of business.
Pollution Prevention Resources	**Free, On-site Technical Assistance** University of Wisconsin Extension Solid and Hazardous Waste Education Center Milwaukee area: 414/475-2845 Remainder of state: 608/262-0385 **Pollution Prevention Information Clearinghouse** Wisconsin Department of Natural Resources Cooperative Environmental Assistance 608/267-9700 or e-mail: cea@dnr.state.wi.us

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